

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 January 2002 (10.01.2002)

PCT

(10) International Publication Number
WO 02/02289 A1

(51) International Patent Classification⁷: **B28D 1/00, 1/22**

(21) International Application Number: **PCT/IB01/01145**

(22) International Filing Date: **27 June 2001 (27.06.2001)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
BO2000A000399 6 July 2000 (06.07.2000) IT

(71) Applicant (for all designated States except US): **CASA DOLCE CASA S.P.A. [IT/IT]; Via Viazza II^o Tronco, N. 45, I-41100 Modena (IT).**

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MINGARELLI, Giorgio [IT/IT]; Via S. Giacomo, 1, I-41100 Modena (IT). MATTIOLI, Andrea [IT/IT]; Viale Toscanini, 55,**

I-41049 Sassuolo (IT). VANDELLI, Cristiana [IT/IT]; Viale XX Settembre, 7, I-41049 Sassuolo (IT).

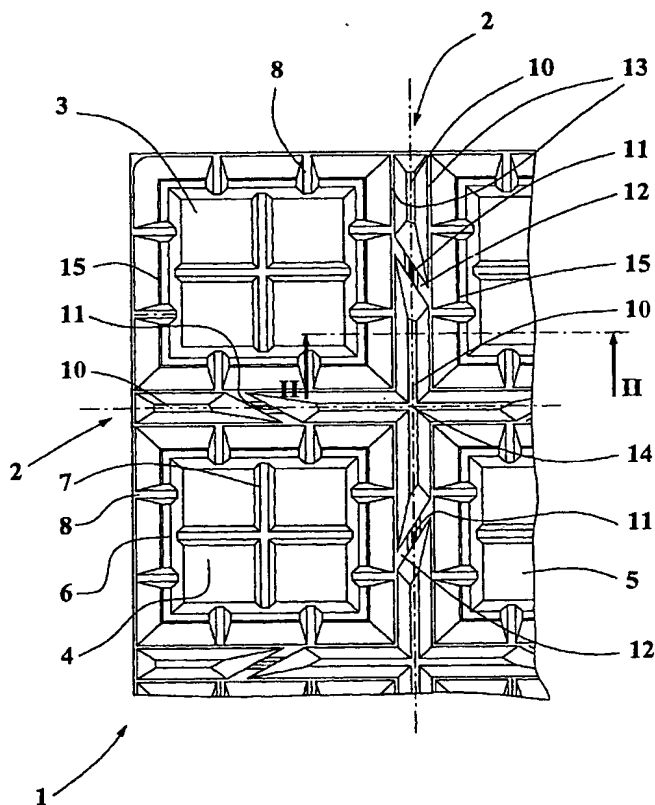
(74) Agent: **AGAZZANI, Giampaolo; Agazzani & Associati S.r.l., Via dell'Angelo Custode, 11/6, I-40141 Bologna (IT).**

(81) Designated States (*national*): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.**

(84) Designated States (*regional*): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,**

[Continued on next page]

(54) Title: **METHOD AND FRACTURABLE TILE FOR MAKING TESSERAE AND LISTELS**



(57) Abstract: A fracturable tile for making tesserae or fillets has on the fixing face a pre-fracture regular grid (13) consisting in two series of parallel and equally spaced pre-fracture lines (2) which extend from an edge to the opposed one of the tile and each one of these pre-fracture lines (2) includes first grooves (10). The pre-fracture grid (12) delimits portions (3, 4, 5) of the tile in order to allow its split in tesserae or listels.



WO 02/02289 A1



IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*

METHOD AND FRACTURABLE TILE FOR MAKING TESSERAE AND LISTELS

TECHNICAL FIELD

5 The present invention refers to the manufacturing of the covering or flooring materials used in the building trade.

Particularly the invention refers to a method and fracturable tile for making tesserae or listels. Both the tile and the tessaras/listels are provided for covering and/or tiling floors or their
10 decoration, building surfaces and architectural elements.

BACKGROUND OF THE INVENTION

They are known tesserae or little tiles carried out by cutting through all the thickness of slabs or
15 tiles of bigger dimensions.

The main drawback of these known tesserae or small tiles consists in that they have precise and regular edges, which are not suitable for the handicraft coverings, floorings and decorations. In fact the regularity of the tessaras carried out using these methods is typical of the industrial
20 products.

Furthermore, there are known tesserae or little tiles carried out from tiles or slabs in which deep grooves are made starting from the fixing face. The split of the tiles or slabs in tessera or little tiles is manually made by operators exerting such strengths to fracture the tiles along the scored
25 lines. The resulting fractured edges are irregular and sharp. A further processing phase allows the chamfering of the fractured edges.

This known method allows giving the tesserae or tiles an irregular aspect but has the main drawback of providing an expensive manual-processing phase dangerous for the operators.
30

A further drawback of this known method is the long processing time that strongly limits the productive capacity.

Another type of tessaras is carried out by making deep grooves starting from the assembly face
35 of slabs or tiles and then making on the groove bottom thinner cuts which split the plate in

tesserae; consequently the cut sides of the tesserae have a thin rim in correspondence of the quarry face. This thin rim is then splinted and made irregular by a tumbling phase. Then the main drawback of these known tesserae consists in that the irregularities are positioned along substantially rectilinear edges.

5

The main object of the present invention is to propose a flooring or covering tile which can be fractured in tessaras or listels having irregular edges, moderately curved and with handicraft aspect.

10 Another object is to propose a fracturable tile fit for making tessara/listels having at least a rectilinear regular edge suitable for connecting other coverings or floors or for making the peripheral covering/flooring portions and having the irregular remaining edges.

A further object is to propose a mechanical-type fracture method for the fracturable tile.

15

The objects above-mentioned are achieved according with the content of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

20 The characteristics of the invention are underlined in the following with particular reference with the attached drawings, in which:

- figure 1 shows a partial plan view of the assembly face of the tile object of the present invention;
- figure 2A shows a partial section view of the tile of figure 1 in an approaching condition of the fracturing means immediately before operating these latter;
- 25 - figure 2B shows a partial section view of the tile portion of figure 2 in a condition immediately following the operation of the fracturing means.

30 In figure 1, the reference 1 indicates a tile, for instance a floor tile or covering tile in ceramics, grès, majolica, porcelain, glass or similar, object of the present invention.

The assembly face of the tile 1 has two series of parallel and equally spaced pre-fracture lines 2 extending from an edge to the opposite one of the tile 1 so forming a regular pre-fracture grid 13.

35

The pre-fracture grid 13 delimits portions first 3, second 4 and third 5 of the tile that can be split in tesserae respectively with two, three and four irregular sides originated from fractures. Each pre-fracture line 2 consists in a series of aligned and alternate first grooves 10 and second grooves 11. These latter are carried out in correspondence of linking stiffenings 12 between
5 portions of the tile 1 split by the grid 14. The stiffenings 12 are oblique, alternatively at opposite directions, with respect to the pre-fractured lines 2 for increasing the stiffness and to trigger irregularities at the fractures.

The grooves, first 10 and second 11, are sideways delimited by flat stopper 13 forming
10 parallelograms peripherally extending to the portions 3, 4 and 5 of the tile 1, split by the grid 14.

Each portion 3, 4, and 5 has, internally with respect to the stoppers 13, first stiffening ribs 15 broken by a plurality of outlets 8 fit, during the assembly phase, to allow the outflow of the air eventually contained into the mortar or fixing glue between the wall and the tile or tessera. The
15 fixing face of the tile 1 further has cross-shaped ribs 7 for stiffening each portion delimited by the grid 13.

Whit reference to figures 2A and 2B, the tile thickness is the smallest in correspondence of the first grooves 10 and the thickness of the stiffenings 12 is reduced in correspondence of the
20 second grooves 11.

It is also provided that the first grooves 10 extend without gap along the whole length of each pre-fracture line 2.

25 The split of the portions 3, 4, and 5 for obtaining a plurality of tesserae is achieved by fracturing several times the tile 1 according to the pre-fracture lines 2 of a series so obtaining linear strips of portions 3, 4 and 5 jointed along a side. The following fracture of linear strips of portions 3, 4 and 5 according to the pre-fracture lines 2 of the second series splits the single tesserae.

30 The fracture of the tile 1 is made according to the method including the following steps of:

- positioning a couple of counter punches 9, for instance linear continuous of length equal or longer than the biggest dimension of the tile 1, in correspondence of a couple of stopper 13 related to a pre-fractured line 2, for instance the first one starting from an edge of the tile 1;
- positioning a punch 16, for instance linear continuous of length equal or longer than the
35 biggest dimension of the tile 1 and with sharp punching top 16a contacting the tile quarry

surface in correspondence of the pre-fracture line 2, delimited by the couple of counter punches 9;

- exerting on the tile 1 a perpendicular force of mutual approach between the counter punches 9 and the punch 16 till the fracture of the tile 1;
- 5 - repeating the fracture for each pre-fracture line 12 parallel to the first one up to the achievement of listel or tessera strips joined at one side only.

At this point, a series of fillets or linear strips of tesserae are obtained.

- 10 The method further provides to repeat the fracture for each pre-fracture line 12 of each strip of tesserae up to the achievement of split tesserae, each one with 2 or 3 or 4 edges originated from fractures and therefore irregular.

- 15 Furthermore, the method provides to subject the tesserae or the split listels to tumbling and/or sandblasting in order to chamfer the edges of the fractures and/or to give them an old-fashioned appearance.

- 20 The main advantage of the present invention is to provide a directly usable tile for floor or covering or fracturable in tesserae with irregular edges, moderately bent with a handicraft aspect.

- Another advantage is to provide a fracturable tile suitable to origin tesserae having one, two or any regular rectilinear edge fit for joining other coverings or floors or making the peripheral covering portions and having the remaining edges irregular.

- 25 A further advantage is to provide a fast, safe and economic mechanical-type method for fracturing the tiles.

CLAIMS

- 1) Fracturable tile for obtaining tesserae or listels characterized in that has on the fixing face a regular pre-fracture grid (13) consisting in two series of parallel and equally spaced pre-fracture lines (2) which extend from an edge to the opposite one of the tile and each of these latter including first grooves (10); the pre-fracture grid (13) delimiting portions (3, 4, 5) of the tile (1) to allow the split of this latter in tesserae or listels.
5
- 2) Tile according to claim 1 characterized in that the first grooves (10) extend without gap along each related pre-fracture line (2).
10
- 3) Tile according to claim 1 characterized in that the first grooves (10) are interrupted by a plurality of stiffenings (12) connecting adjacent portions (3, 4, 5) fit to strengthen the tile 1.
- 15 4) Tile according to claim 3 characterized in that each stiffening (12) has a respective second groove (11) aligned with the relative first groove (10).
- 5) Tile according to claim 3 or 4 characterized in that the connecting stiffenings (12) between the portions (3, 4, 5) are alternatively slanting positioned with opposed angles with respect to the respective pre-fracture lines (2) for increasing the stiffness of the tile (1) and triggering the irregularities in the fractures.
20
- 6) Tile according to any of the preceding claims characterized in that the thickness of the tile (1) in correspondence of the first grooves (10) has the lowest value.
25
- 7) Tile according to any of the preceding claims characterized in that each portion (3, 4, 5) delimited by the grid (14) further has first ribs (15) interrupted by a plurality of outlets (8), these latter and the first ribs (15) being fit respectively for the air outflow during the assembly and the stiffening of each portion (3, 4, 5).
30
- 8) Tile according to claim 7 characterized in that each portion (3, 4, 5) delimited by the grid (14) further has cross-shaped ribs (7) connected to the first ribs (15) and fit for stiffening each portion (3, 4, 5).
- 35 9) Method for fracturing a fracturable tile to obtain tesserae or listels, characterized in that

provides:

- to position a couple of counter punches (9) in correspondence of a couple of stoppers (13) related to a pre-fracture line (2) of said tile (1);
- 5 - to position a punch (16) contacting the quarry surface of the tile in correspondence of the pre-fracture line (2) delimited by the couple of counter punches (9);
- to apply a mutual approach force, between the counter punches (9) and the punch (16), up to the achievement of the fracture of the tile (1), interposed between them;
- to repeat the fracture for each pre-fracture line (12) up to the achievement of fillets or strips of tesserae joined at one side only.

10

10) Method according to claim 9 characterized in that further repeats the fracture for each pre-fracture line (12) of each strip of tesserae until splitting tesserae each one with 2 or 3 or 4 edges originated from fractures and therefore irregular.

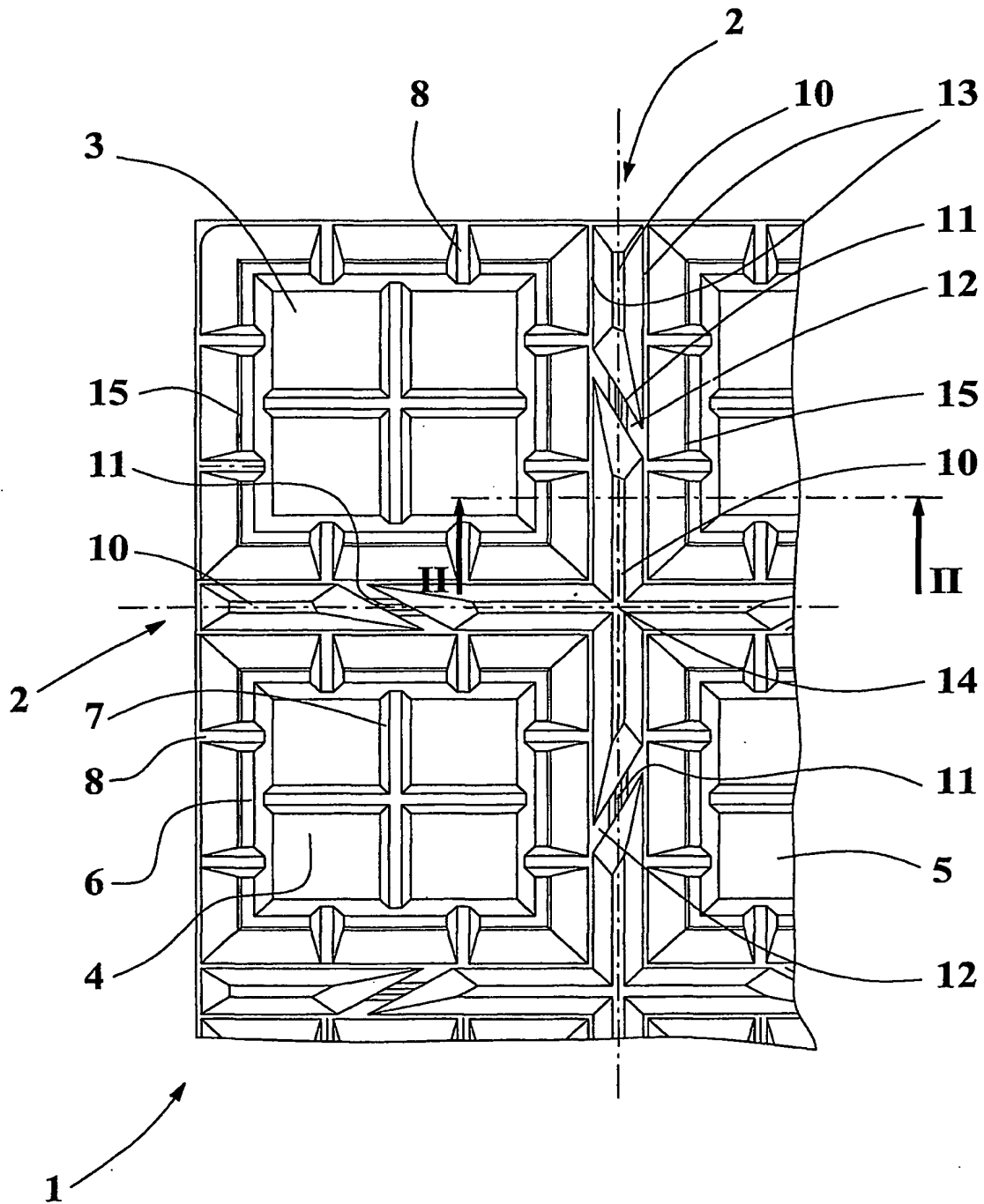
15

11) Method according to claim 9 or claim 10 characterized in that further tumbles the split tesserae or listels in order to chamfer the fracture edges and/or to obtain an old-fashioned appearance.

20

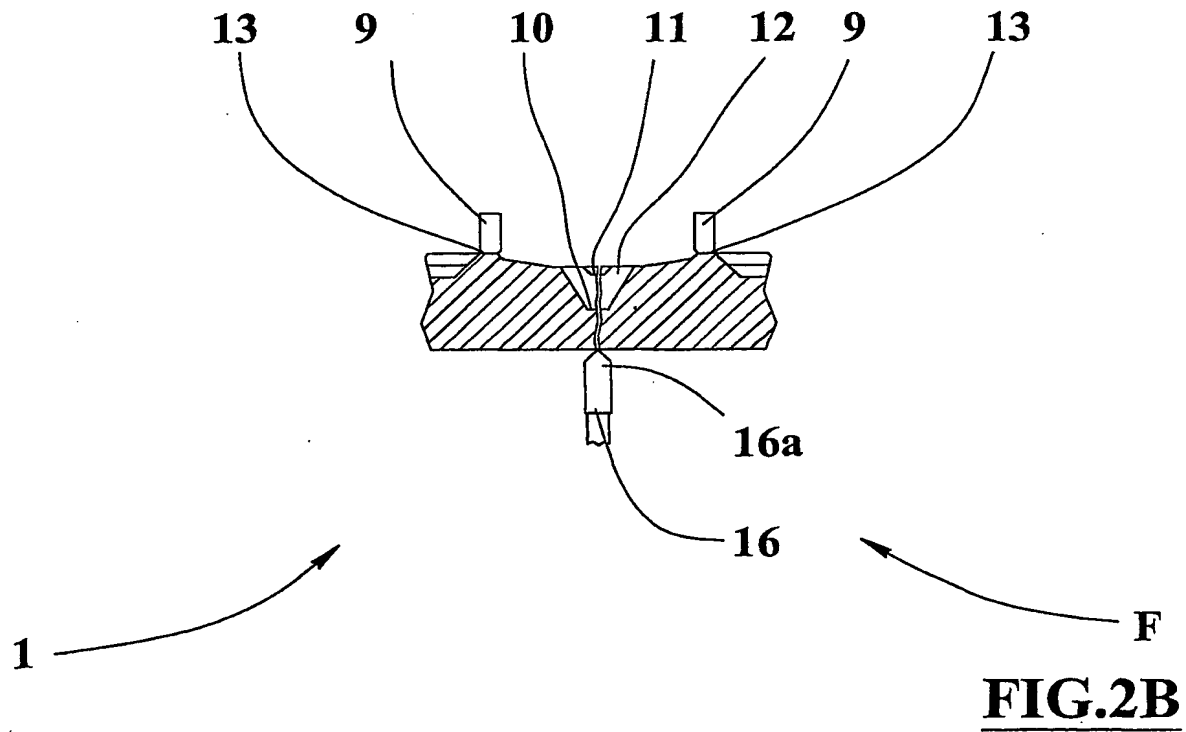
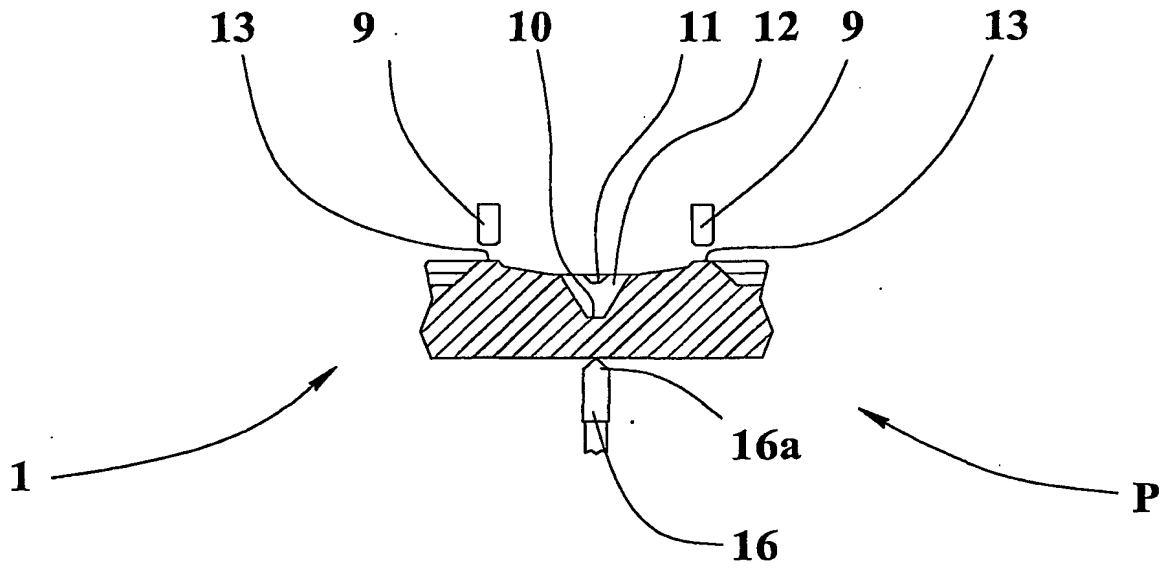
12) Method according to claims 9 or 10 or 11 characterized in that further sandblasts the split listels or tessara in order to confer them an old-fashioned appearance and/or to obtain an old-fashioned appearance.

1/2

FIG.1

2/2

FIG.2A



INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 01/01145

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B28D1/00 B28D1/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B28D E04F B28B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 894 593 A (KER AV S R L) 3 February 1999 (1999-02-03) the whole document	1,2,6
Y		9-11
Y	DE 296 04 624 U (LENARZ HANS) 29 August 1996 (1996-08-29) the whole document in particular figure 1	9-11
A	GB 1 471 469 A (BAUTECHNOLOGIE FORSCH) 27 April 1977 (1977-04-27) page 3, left-hand column, line 19 -page 4, left-hand column, line 17 figures	3
	-/-	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

18 September 2001

Date of mailing of the international search report

28/09/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Rijks, M

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB 01/01145

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 144 782 A (GORDON DONALD GEORGE) 13 March 1985 (1985-03-13) page 1, left-hand column, line 46 - line 56 figures 1,2 -----	7,8
A	DE 35 39 566 A (MENZEL HANS C;SCHUMACHER KARLHEINZ) 21 May 1987 (1987-05-21) the whole document in particular column 1, line 59 - line 66 -----	12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 01/01145

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0894593	A	03-02-1999	IT	M0970132 A1	18-01-1999
			EP	0894593 A2	03-02-1999
DE 29604624	U	29-08-1996	DE	29604624 U1	29-08-1996
GB 1471469	A	27-04-1977	AU	7038974 A	08-01-1976
			BE	817072 A1	16-10-1974
			CA	1001875 A1	21-12-1976
			CH	580201 A5	30-09-1976
			DK	315874 A	17-02-1975
			ES	427741 A1	01-08-1976
			FR	2235228 A1	24-01-1975
			IT	1015356 B	10-05-1977
			JP	50052825 A	10-05-1975
			NL	7408807 A	31-12-1974
			SE	7408002 A	30-12-1974
GB 2144782	A	13-03-1985	IE	53996 B1	10-05-1989
			IE	53996 L	03-09-1984
DE 3539566	A	21-05-1987	DE	3539566 A1	21-05-1987